Spatially-resolved Analysis of the Upper Convection-Zone

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Plane-wave (ring-diagram) analysis of high-degree modes in data from the SOI/MDI instrument on SOHO permits us to determine spatial and temporal variations of the structure and dynamics of the upper convection zone, to a depth of about 0.1 solar radius below the photosphere.

The spatial resolution achieved with full-disc data is at least 15 heliographic degrees (180 Mm), and the temporal resolution is of order 1 day. Data useful for such analysis cover at least two full Carrington rotations in each year since 1996. Additional data with three times the spatial resolution over a small portion of the disc are available for shorter durations at various times. Analyses of the full-disc data from the earlier years have already revealed systematic patterns in the global meridional flow and flows associated with active regions during the early phase of the solar cycle. Here we report on variations and trends seen in the flows as the activity level of the cycle approaches maximum.

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